Orange Apps

UserLogonIO V1.0

KUKA KRC4: User logon using IO interface

User Manual

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The contents of this document have been tested with the described software. Since deviations cannot be excluded, no guarantee for full compliance can be taken.

History of document versions

Version	Date	Author	Change Reason / Comment
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1 Introduction

1.1 Target group

This documentation is intended for users with the following skills:

- Usage of KUKA KRC4 robots

1.2 Representation of information

These notes indicate that death or severe personal injury will be safe or very likely to occur if precautions are not taken.

These notes indicate that death or serious bodily injury could occur if precautions are not taken.

These notes indicate that minor personal injury can result if precautions are not taken.

These notes indicate that damage may occur if precautions are not taken.

This manual contains useful tips or special information for the current topic.

1.3 Terminology used

Notion	Description
SmartPad	Handheld unit
KCP	KUKA Control Panel
USB dongle	Dongle

Table 1-1: Used Terms

1.4 Trademarks

. NET Framework is a trademark of Microsoft Corporation.

Windows is a trademark of Microsoft Corporation.

2 Product description

The software tool UserLogonIO provides a personalized logon to the robot system by means of input signals on the robots IO interface from an external system.

Features and characteristics

- Automatic change of the user group by means of input signals
- Optionally, automatic change of the robots language at every change of the user group
- The registration of the user group to the robot system can be done either bit or integer-coded
- The user logon is independent of the robot mode
- Optionally, the transfer of a maximum 32-bit wide user ID is possible
- Optionally, the transfer of a maximum 8-bit-wide language ID is possible
- The IO interface and the way users logon is configurable by a fully implemented plugin and is stored in an XML file
- Each user logon with the given user group (and optionally with user-ID) and the date and time is stored in the logbook
- Each change of the IO-configuration is saved in the logbook
- No KRL files or KUKA system files are manipulated
- A User Documentation (German / English) is included

Security

- The plugin to configure the IO interface is restricted to the user group "Administrator"
- The configuration is saved in an XML file and is provided with a checksum to detect manual changes in the configuration file. In case of a changed configuration file the functionality of the user login is disabled until detection of a correct configuration file.

Hint

- The KUKA standard user registration will continue to remain functional. To protect against abuse the passwords of the KUKA standard user login should be changed.

3 Installation, uninstallation

3.1 Installation / removal to / from the robot controller

The installation/uninstallation is done via the *additional software* option. These can be found in the main menu under *start-up*. The further procedure is analogous to install / uninstall KUKA technology software. This method is documented in the KUKA Exert documentation.

3.1.1 System requirements for running

Minimum Requirements Hardware / Software

- KUKA system software 8.2/8.3

If the software KUKA.CPC is used on the robot, a software certificate is needed to install the plugin.
In this case, please get into contact with our customer service (email to info@orangeapps.de) before purchasing this product.

3.2 Install UserLogonIO or upgrade to new version

Requirement

- User group Expert

For installation on the three systems, Real Robot, Office Lite and Office PC follow these steps:

Method

1. Extract the .Zip file
2. Copy the installation folder ***OrangeApps.UserLogonIO*** containing the setup files to a USB stick or directly to a drive on the target system (for example, d: \).
3. If you are already in possession of a valid license file, copy it to the files in the installation folder. The license file is automatically detected and installed during setup. Alternatively, you can manually install the license file after installation.
4. When installing from a USB stick, connect this to the controlling PC or the SmartPad.
5. Choose ***commissioning → Additional software*** from the main menu.
6. Click the button ***New software***.
7. You'll get a list of available software for installation. If there's no entry ***OrangeApps.UserLogonIO*** in the list, click ***Refresh***. If now the entry appears, go to step 10
8. If the entry does not appear, the drive from where to install must be configured first. To do this, choose ***Configuration***. In the new window you now have the option to select the path where to find the folder ***OrangeApps.UserLogonIO.***
9. Select an empty cell in the ***installation paths for options*** and click ***path selection***. The available drives are displayed. Select the drive on which the folder ***OrangeApps.UserLogonIO*** is located and save your selection with. The window closes. ***OrangeApps.UserLogonIO*** should now appear as an entry in the list. If this is not the case, press ***refresh*** and/or repeat steps 7 to 8
10. Highlight the entry ***OrangeApps.UserLogonIO*** and press ***Install***. Confirm the security prompt with ***Yes***.

11. Read the license agreement carefully. Explain your agreement to the license terms by clicking ***I Accept*** and continue the installation by clicking ***Continue***. If you do not agree with the license terms, please cancel the installation by clicking ***Cancel***.
12. The installation will be prepared now. To perform the final installation the control PC has to be restarted. This can immediately be executed by clicking ***Reboot Control PC now*** or later by clicking ***later***.
13. If you select ***later***, the window is closed. In order finalize the installation proceed with step 14. If you select ***Reboot Control PC now***, a restart of the control PC will be performed. Step 15 is then executed.
14. Perform a shutdown of the control PC by clicking ***shutdown*** in the main menu.
15. During reboot of the control PC UserLogonIO will be installed on the computer.
16. Remove the USB stick from the PC.

3.3 Uninstall UserLogonIO

Requirement

- User group Expert

Method

1. Choose ***commissioning→ Additional software*** from the main menu.
2. Highlight the ***OrangeApps.UserLogonIO*** and click ***Uninstall***. Answer the security prompt with ***Yes***. The uninstallation is prepared. After completion of the preparatory work, a message box appears. To perform the final installation the control PC has to be restarted. To perform the final installation the control PC has to be restarted. This can immediately be executed by clicking ***Reboot Control PC now*** or later by clicking ***later.***
3. If you select ***later***, the window is closed. In order finalize the uninstallation proceed with step 4. If you select ***Reboot Control PC now***, a restart of the control PC will be performed. Step 5 is then executed.
4. Perform a shutdown of the control PC by clicking ***shutdown*** in the main menu.
5. During reboot of the control PC UserLogonIO will completely be uninstalled from the computer.

4 Licensing

UserLogonIO is generally subject to licensing. Licensing is a license file. For testing purposes, are free trial licenses under www.orangeapps.de available. Without a license, the software is indeed run, but the recognition of a user application via the configured IO interface is disabled.

Reference

- A license for each robot is necessary.
- Per robot once a trial license can be obtained
- Trial licenses limited in time
- For environments Office Lite and OfficePC trial licenses can be requested unlimited.
- Date manipulations on the system are detected, UserLogonIO automatically disables the license

4.1 Licenses for robots, Office Lite office computer and

Trial licenses can be obtained directly at www.orangeapps.de. Runtime licenses are delivered on receipt of the license fee.

4.1.1 Robot license

In order to obtain a valid license, you need the serial number of the robot. These can be found on the rating plate of the robot or in the robot software in the Help menu ***Help→Info→Robot→Serial number***.

4.1.2 License for KUKA OfficePC/ OfficeLite

The product ID is "OFFICE". You need this ID in order obtain a valid license on www.orangeapps.de.

4.1 Installing a License

4.1.1 UserLogonIO is not installed yet

Copy before the installation of ***UserLogonIO*** the license file into the installation folder as below 3.2 described.

4.1.2 UserLogonIO is already installed

Method 1

- Plug in a USB stick containing the license file to a USB port of the controller or SmartPad.
- Alternatively, copy the license file to the robots d: drive
- At startup of the software the license will be copied automatically into the license folder and then be enabled. Note: A run-time license in the license folder will not be overwritten by a trial license
- Remove the USB stick

Method 2

- Copy the obtained license in the folder c:\KRC\TP\UserLogonIO\Lic

5 Description of the function

A single control bit on the IO-interface indicates a user login to the robot system. Depending on the configuration of the IO area a toggle of the control bit from FALSE to TRUE causes the user group, the user ID and language ID on the IO-interface to be read. Thereafter the user registration is performed accordingly. If the control bit falls back to FALSE the user is logged out and the lowest user mode "operator" and the previously selected language are selected. Each user login is stored in the logbook of the robot. The selection of the user group can be done bit-coded or integer-coded.

Input ranges of IO interface

Input	Description	Range of values	Width
Control bit	Input which indicates the user login to the robot system	TRUE, FALSE	1 bit
User Group	Area of inputs which indicates the user group	INT, BIT	5-8bit
User ID	Areas of inputs to indicate a user ID. This user ID will be stored in the logbook. Whether a user ID is used, can be configured.	INT	1-32bit
Language ID	Areas of inputs to indicate a language ID. The language of the SmartHMI is switched accordingly. Whether language switching is used can be configured.	INT	1-8bit

Table 5-1: Input ranges of IO interface

Bit-coded registration

The user group selection on the robot system is done by bitwise assignment to the available user groups. If multiple bits are set the lowest user group out of the bits is selected.

Integer-coded registration

The user group selection on the robot system is done by passing an integer value to the robot system corresponding to the user groups available. Integer values outside the table below will be ignored.

Available User Groups

Type of Application		Groups
Integer-coded	Bit-coded	
10	Bit 1	User
20	Bit 2	Expert
27	Bit 3	Safety Recovery
29	Bit 4	Safety Maintenance
30	Bit 5	Administrator

Table 5-2: Available user group

User ID

Passing a user ID as INT value is optional. The user ID is saved in the logbook.

Language ID

Passing a language ID as INT value is optional. If a language ID is specified the language of the SmartHMI is changed accordingly the following table:

Value of the language ID	Language	Value of the language ID	Language
1	Czech	12	Romanian
2	Danish	13	Slovak
3	German	14	Slovenian
4	English	15	Finnish
5	Spanish	16	Swedish
6	French	17	Turkish
7	Italian	18	Greek
8	Hungarian	19	Russian
9	Dutch	20	Korean
10	Polish	21	Chinese
11	Portuguese	22	Japanese

Table 5-3: Available languages

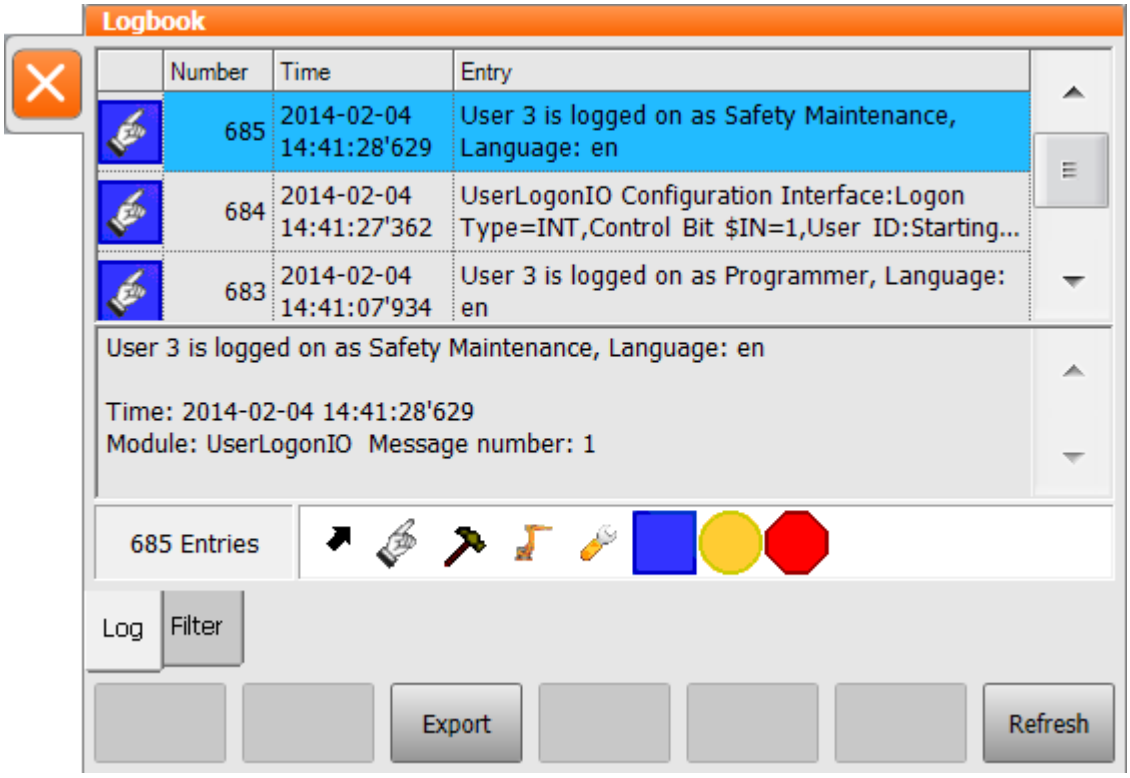
Peculiarities of language change during user logon

If no language switching is used (used = FALSE), then even with a given integer value > 0 on the IO interface no change of the currently selected language is performed.

If language switching is used (use = TRUE) the language will be switched to English by default when an Integer value = 0 on the IO interface is given.

Entry in the logbook

Each user login is stored, specifying the user ID and the language in the logbook of the robot.



6 Configuration

The configuration of the IO interface is stored in the XML file "OrangeApps.UserLogonIO.xml" and is available as a plugin available.

Requirement to display the Setup Plugins

- User "Administrator" group

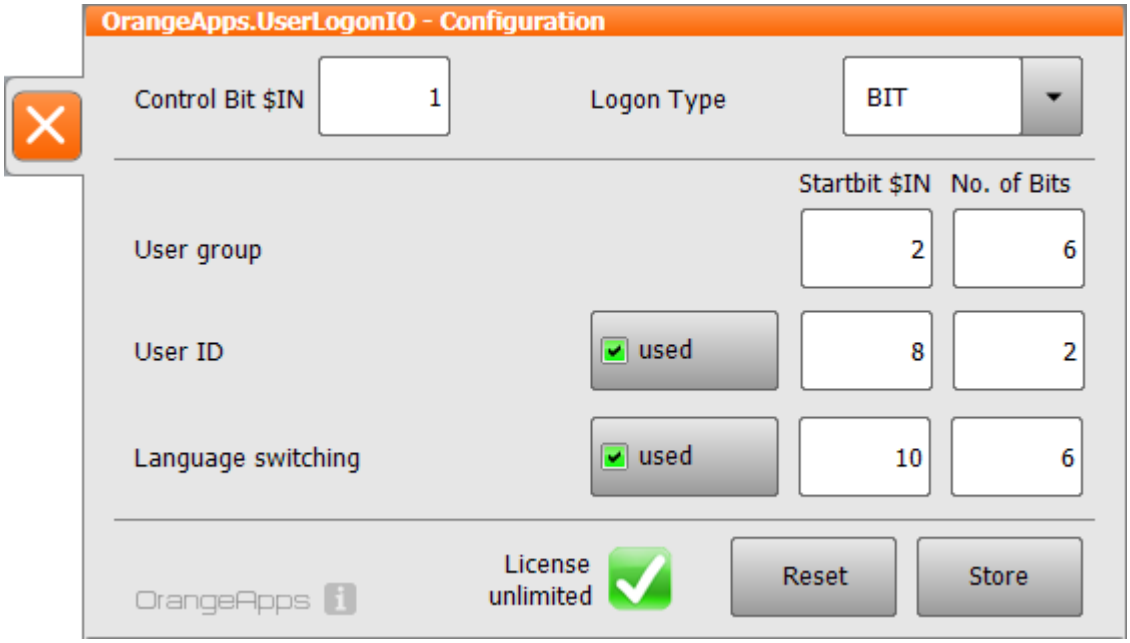
Calling the configuration plugin

The call of the Configuration Plugin takes place in the main menu under Configuration → ***UserLogonIO.***

The following configuration options are available

- Number of control bits
- Way users log on ("BIT" or "INT")
- Start bit and BIT-width of the user group (minimum of 5 bits, a maximum of 8 bits)
- Using a user ID
- Start bit and BIT-width of the user ID (up to 32 bit)
- Use of a language ID
- Start bit and BIT-width of the language ID (up to 8-bit)

Configuration Plugin



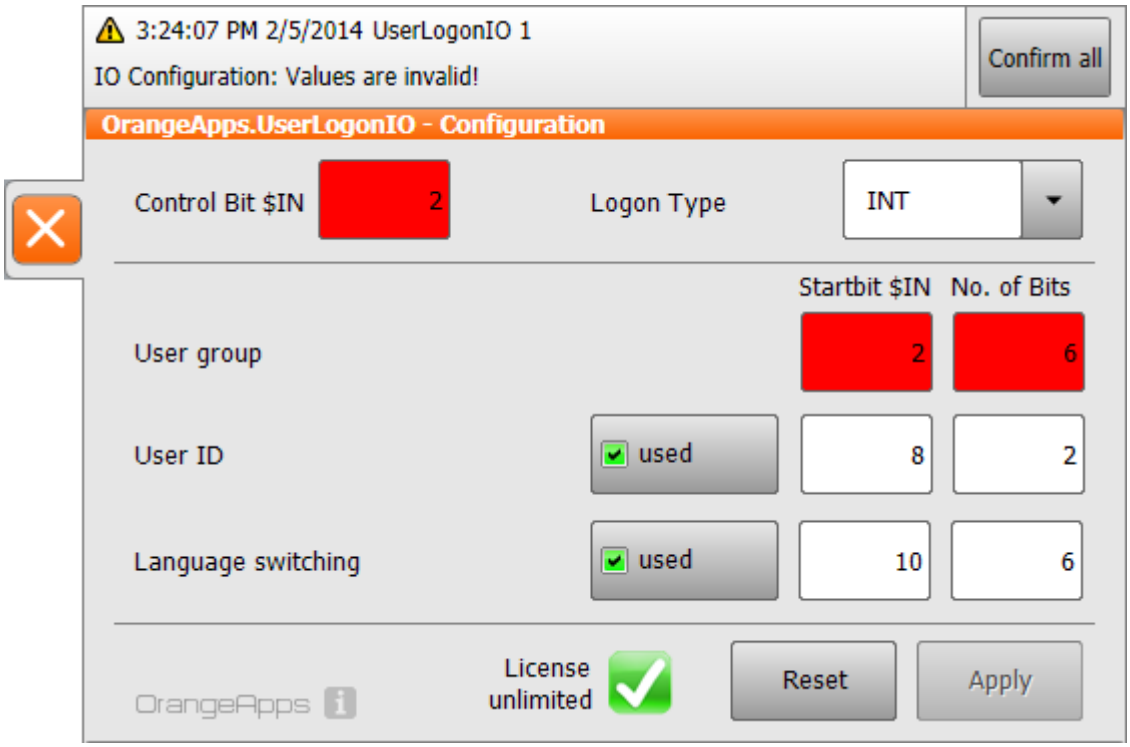
Controls

Element	Attribute	Description	Possible values
Control Bit $IN	-	Configures which input indicates the user login to the robot system	1-4096
Logon Type	-	Configures whether the selection of the user group is given bit-coded or as an integer value on the IO interface	INT, BIT
User Group	Start bit $IN	First bit of the user group	1-4096
	No. of Bits	Bit width of the user group	5-8
User ID	Used	Using the user ID for entry in the logbook	TRUE, FALSE
	Start bit $IN	First bit of the user ID	1-4096
	No. of Bits	Bit width of the user ID	1-32
Language switch-over	Used	Use the language ID for switching languages	TRUE, FALSE
	Start bit	First bit of the language ID	1-4096
	No. of Bits	Bit width of the language ID	1-8

Table 6-1: Controls in the configuration plugin

Error Checking

Simultaneously to an input of a value a plausibility check is performed. If an error occurs a state message appears in the message window, the entry is marked in red and the ***Apply*** button is deactivated.



Buttons

Button	Description
Return	resets the displayed values to the actually saved values
Apply	Saves the displayed values

Table 6-2: Buttons in the configuration plugin

License verification

The presence of a valid license will be periodically checked and displayed in the plugin. If no license is available, the recognition of a user registration is disabled. Using a time-limited license, the number of days remaining before the user login is disabled is displayed.

Security

To protect against manipulation of the user login the access of the configuration plugin is allowed only for the user group "Administrator". Any change in the configuration is saved in the logbook of the robot.

The entered values are stored in the file under UserlogonIO.xml generating a security code. This security code is checked for plausibility. If the plausibility test fails the function of the user login is disabled until a positive test is performed. Thus manually changing of the configuration file is prevented.

A generated XML file can be copied from robot to robot.

The programming of the user login on to the higher-level control must be only be performed by the plant operator authorized personnel. Additionally this documentation must be observed.

The correct function of the IO interface must be checked regularly and documented.

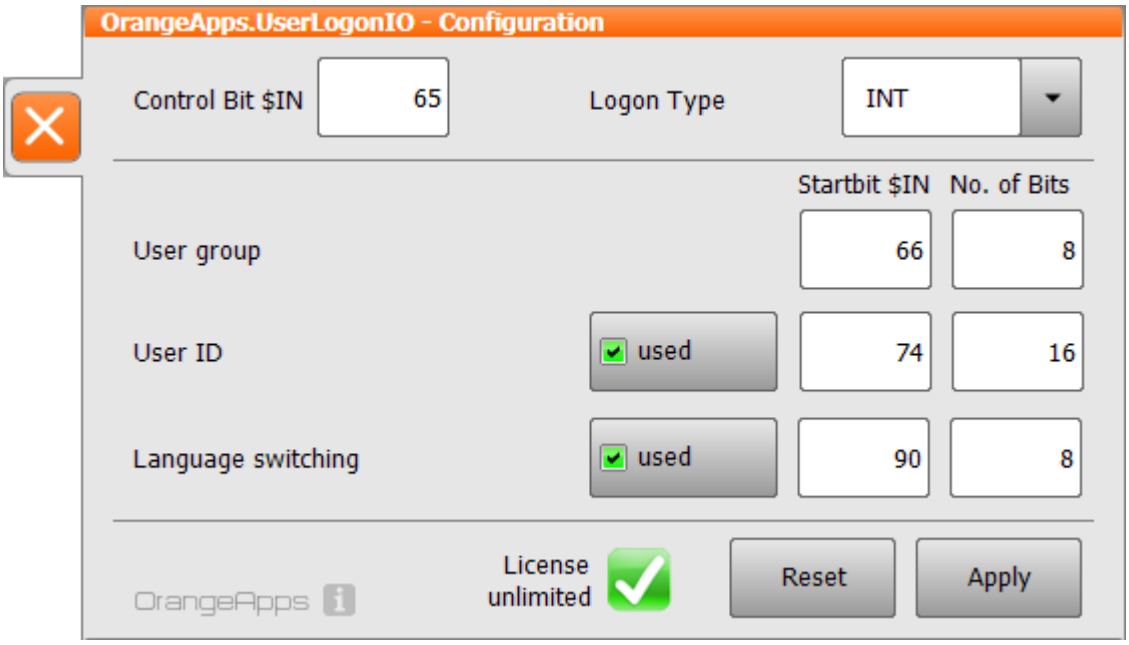
An incorrect configuration of the interface can have a false, unauthorized, user notification.

Configuration Examples

Example 1

- User Switching via INT value
- Control bit is on input 65
- User Group: start bit is on input 66 bit, width is 8 bits
- User ID: used YES, start bit is input to 74 bit, width is 16 bits
- Language ID: used YES, start bit is input to 90 bit, width is 8 bits

Configuration Plugin



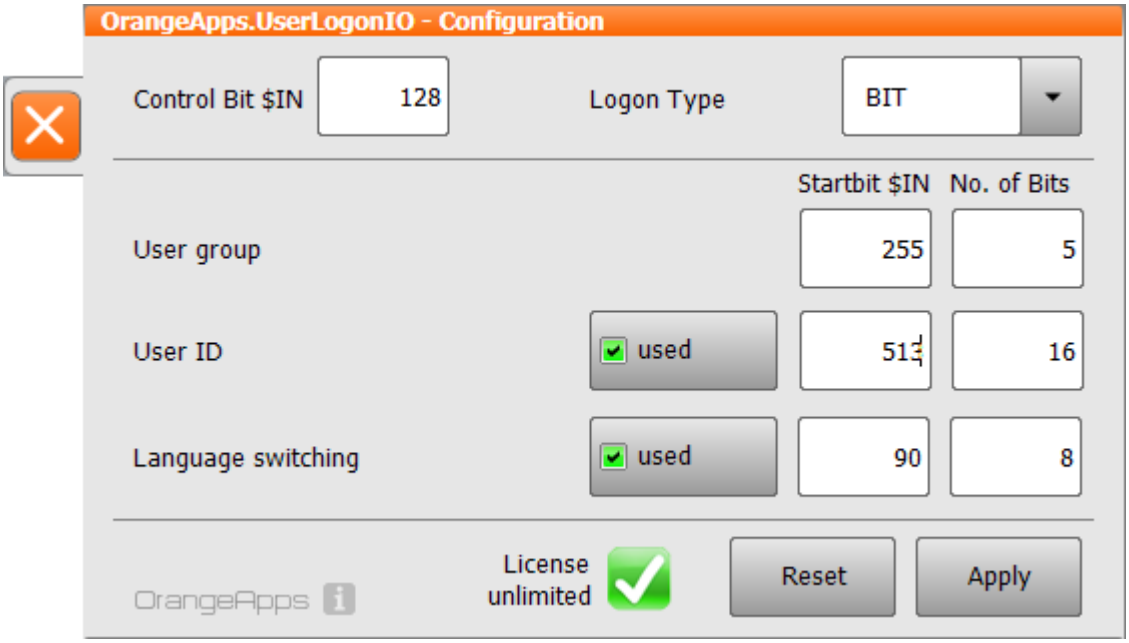
Storing the values in the XML file:

```
<Configuration>
  <LogonType>INT</LogonType>
  <LogonBit>65</LogonBit>
  <UserLevel Start="66" Length="8" />
  <UserID Enable="True" Start="74" Length="16" />
  <LanguageID Enable="True" Start="90" Length="8" />
  <Security>501EAA5FC646CDAF42D51C04874EF856</Security>
</Configuration>
```

Example 2

- Bit coded User Switching
- Control bit is on input 128
- User Group: start bit on input 255, bit width 5 bits
- User ID: used Yes, start bit at input 513, bit width of 16 bits
- Language ID: used No

Configuration Plugin



Storing the values in the XML file:

```
<Configuration>
  <LogonType>BIT</LogonType>
  <LogonBit>128</LogonBit>
  <UserLevel Start="255" Length="5" />
  <UserID Enable="True" Start="513" Length="16" />
  <LanguageID Enable="False" Start="530" Length="8" />
  <Security>3FC6E1C0C3A17531724BDE7E798B8909</Security>
</Configuration>
```

7 Starting the software

The software runs as a background service and is started automatically when booting the robot controller.

8 Messages

The following messages can be displayed in the message window

Message	Description	Error type	Number
IO configuration: values are invalid!	Data entered in the configuration plugin are incorrect. Correct the values.	Status	1
UserLogonIO.xml file has been deleted. UserLogonIO is temporarily disabled!	The specified file was deleted. Copy the correct file to directory c:\ KRC\User	Status	2
Plugin OrangeApps.UserLogonIO successfully loaded	The plugin was successfully loaded at startup of the control	Info	51
User {ID} is logged on as {user group}	Represents, under which user group the user with the {id} is logged into the system	Info	60
The default user operator is logged on	The default user “operator” is logged on	Info	62
Path C:\KRC\User not found	The folder c:\KRC\User could not be found	Info	100
file UserLogonIO.xml not available. Automatically creation performed. Check the configuration!	The specified file could not be found and was created automatically using default values (all 0 or FALSE). Additional messages will follow stating the result of the verification check. Perform a new Configuration or copy a correct file in the directory c:\KRC\User.	Info	101
The file UserLogonIO.xml cannot be loaded. Copy the correct file to the directory C:\KRC\User, and then restart the SmartHMI.	The UserLogonIO.xml file appears to be corrupted and cannot be loaded. Check the file and restart the SmartHmi.	Info	102
logon type incorrectly configured, must be INT or BIT! Value set to 'INT' automatically.	The value of the element logo type in the UserLogonIO.xml file has an incorrect value and has been automatically set to INT. Verify the configuration.	Info	103
logon bit incorrectly configured, must be type of integer. Value set to 0 automatically	The value of the element Logonbit in the UserLogonIO.xml file has an incorrect value and has been automatically set to 0. Verify the configuration.	Info	104
start bit for user group incorrectly configured, must be type of integer. Value automatically set to 0	The value of the attribute Start of the element user level in the file UserLogonIO.xml has an incorrect value and has been automatically set	Info	105

	to 0. Verify the configuration.		
no. of bits for user group incorrectly configured, must be type of integer. Value automatically set to 0	The value of the attribute length of the element user level in the file UserLogonIO.xml has an incorrect value and has been automatically set to 0. Verify the configuration.	Info	106
Flag user group used incorrectly configured, must be TRUE or FALSE. Value automatically set to FALSE	The value of the attribute USED of the element UserID in file UserLogonIO.xml has an incorrect value and has been automatically set to FALSE. Verify the configuration.	Info	107
start bit for user-id incorrectly configured, must be type of integer. Value automatically set to 0	The value of the attribute START of the element UserID in file UserLogonIO.xml has an incorrect value and has been automatically set to 0. Verify the configuration.	Info	108
no. of bits for user-id incorrectly configured, must be type of integer. Value automatically set to 0	The value of the attribute LENGTH of the element USER LEVEL in file UserLogonIO.xml has an incorrect value and has been automatically set to 0. Verify the configuration.	Info	109
'language switching used' incorrectlyly configured, must be TRUE or FALSE. Value automatically set to FALSE	The value of the attribute USED of the element languageID in file UserLogonIO.xml has an incorrect value and has been automatically set to FALSE. Verify the configuration.	Info	110
start bit for language switching incorrectly configured, must be type of integer. Value automatically set to 0	The value of the attribute START of the element LanguageID in file UserLogonIO.xml has an incorrect value and has been automatically set to 0. Verify the configuration.	Info	111
no. of bits for language switching incorrectly configured, must be type of integer. Value automatically set to 0	The value of the attribute LENGTH of the element LanguageID in file UserLogonIO.xml has an incorrect value and has been automatically set to 0. Verify the configuration.	Info	112
Check sum error, impossible to read value	The value of the element SECURITY in file UserLogon.xml can not be read. Check the correctness of the file.	Info	113
Check sum error, check sum is invalid	The value of the element SECURITY in file UserLogon.xml does not match with the calculated value. Check the correctness of the file.	Info	114
no. of bits user group has incorrect value, min. 5 and max. 8 allowed	The value of the attribute LENGTH of the element user level in file UserLogonIO.xml is outside the limits. When logon type BIT is used at least 5 bits are required.	Info	180
no. of bits user group has	The value of the attribute LENGTH of	Info	190

incorrect value, min. 6 and max. 8 allowed	the element user level in file UserLogonIO.xml is outside the limits. When logon type INT is used at least 6 bits are required.		
{Element} has incorrect value, must be higher than 0	The value of an element in the file UserLogonIO.xml is less than 1, but must be greater than or equal to 1	Info	200
Value exceeds maximum number of inputs	The value of an element in the file UserLogonIO.xml exceeds the maximum available number of inputs (= 4096)	Info	210
Range overlap	At a value of an element in the UserLogonIO.xml file, there is a range overlap with the value of another element	Info	220
Configuration successfully saved	The entered values in the configuration plugin were saved successfully.	Info	400
there's no user group for value {value}	There is no user group for the value of the user group on the IO interface.	Info	500
The configuration has been changed. Would you like to save?	The configuration plugin was closed without saving the changed values. Yes button saves and closes the form. No button closes the form without saving. Cancel button cancels the closing of the form.	Dialogue	600
No license for robot {serial number}. UserLogonIO is inactive.	The license file to operate the software in a production environment is missing for this robot serial number. UserLogonIO is inactive.	Status	101
No license file for OFFICE available. UserLogonIO is inactive.	The license file for the operation of the software on the office computer systems and Office Lite is missing. UserLogonIO is inactive.	Status	101
License for robot {serial number} is invalid or expired. UserLogonIO is inactive	The license to operate the software in a production environment for these robot serial number expired or is invalid. UserLogonIO is inactive.	Status	102
{x} Days left until license expires	Number of days UserLogonIO can still be used.	Status	103

Table 8-1 Messages

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